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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,583	09/09/2003	James Robert Champion	FOM-139.02	3393
25181	7590	06/28/2005	EXAMINER	
FOLEY HOAG, LLP PATENT GROUP, WORLD TRADE CENTER WEST 155 SEAPORT BLVD BOSTON, MA 02110			NATALINI, JEFF WILLIAM	
			ART UNIT	PAPER NUMBER
			2858	

DATE MAILED: 06/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

5m

Office Action Summary	Application No. 10/658,583	Applicant(s) CHAMPION ET AL.	
	Examiner Jeff Natalini	Art Unit 2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-31 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 April 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Information Disclosure Statement

1. The concise explanation of the relevance of cited reference FR2763682, has been reviewed and it is determined that the instant invention distinguishes itself over reference FR2763682.

Drawings

2. The drawings are objected to because container-208 as described in the specification on page 12 (paragraph 23) is not labeled in figure 2. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claims 1 and 7 are objected to because of the following informalities:
- In regard to claim 1, there is no antecedent basis for "the first electromagnetic signal" in the first indentation, it is introduced in the second indentation where stated "a transmitter operable to drive a first electromagnetic signal". The first indentation should read "a first electromagnetic signal" and the transmitter should drive "the first electromagnetic signal".
 - In regard to claim 7, the claim requires a period to be placed at the end.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-3, 6-9, 11-14, 20, and 22-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Macke, Sr. et al. (6137282, herein to be referred to as Macke) in view of Blaine (6023970).

In regard to claims 1, 20, 25, 26, 28, 29, and 31, Macke discloses a system/method for determining a level of a substance (abstract), the system/method comprising:

a first conductive element (fig 4 (306)) and a second conductive element (304) so disposed with respect to each other that when the first and second elements extend through a boundary between a plurality of substances whose dielectric constants differ (col 1 line 5-10; in a material sensor the material will have a different dielectric than the air that will be present over the level of the material), the first electromagnetic signal will induce a second electromagnetic signal to propagate along the second conductive element (fig 4; col 4 line 66 – col 5 line 16);

a transmitter operable to drive a first electromagnetic signal along the first conductive element (fig 4 (302); col 4 line 66 – col 5 line 16);

a coupler (fig 4 310a-f) positioned at a boundary between the substances (material level is seen as a key is depressed to create a boundary between substances, seen in fig 2);

a receiver operable to receive the second electromagnetic signal (col 5 line 8-10);

and a processor executing instructions to determine a level of at least one of the substances based at least in part on a time delay between the first and second electromagnetic signals (fig 1 (TDR sensor and processing unit); col 3

line 45-49 explains that the components of "prior art" figure 1 are in 102, 202, 302, and 402).

Macke lacks specifically stating that the transmitter drives a first electromagnetic signal without also driving the second conductive element and wherein the coupler, couples the first and second conductive elements so as to launch the second electromagnetic signal along the second conductive element when the first electromagnetic signal reaches the position of the coupler.

Blaine states that the transmitter drives a first electromagnetic signal without also driving the second conductive element (col 9 line 58-60 and col 11 line 32-35; has a separate transmit and receive trace) and a coupler for coupling the first and second conductive elements so to launch the second electromagnetic signal along the second conductive element when the first electromagnetic signal reaches the position of the coupler (col 11 line 32-44).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Macke to have a transmitter drive a first signal without driving a second and a coupler for coupling the conductive elements to launch the second signal along the second element when the first signal reaches the coupler in order to have an accurate sensor with increased sensitivity (col 2 line 50-57; col 11 line 45-49).

In regard to claims 2 and 22, Macke discloses wherein the first and second conductive elements (fig 4 (306, 304)) are positioned substantially parallel to each other and substantially perpendicular to boundary between the substances (material level is

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seen as a key is depressed to create a boundary between substances, best illustrated in fig 2 and also seen in fig 4).

In regard to claim 3, Macke discloses an electromagnetic signal with ultra-wideband frequency (col 3 line 7-17, the pulse has a wide range).

In regard to claim 7, Macke discloses a receiver for detecting the time delay between the first and second electromagnetic signals (fig 1 (20, 22); col 3 line 27-30).

In regard to claim 8, Macke discloses wherein the receiver includes a time equivalent circuit (fig 1 (20, 22, 24); col 3 line 27-30).

In regard to claim 9, Macke discloses wherein the first and second conductive elements form a parallel conductor transmission line structure (fig 4 (306,304) with TDR practiced within the structure; col 1 line 36-37).

In regard to claims 11 and 12, Macke discloses wherein the first and second conductive elements exhibit quadrilateral cross-sections (fig 4 (306,304) the cross section will contain four sides) and substantially identical cross sections (fig 4, 306 and 304 are the same).

In regard to claims 13 and 23, Macke discloses wherein the amplitude of the second electromagnetic signal is substantially independent of dielectric properties associated with the substances forming the boundary (col 3 line 23-26).

In regard to claim 14, Macke lacks disclosing wherein the coupler exhibits a length corresponding to at least one-quarter of a propagation velocity pulse length of the first electromagnetic signal.

MPEP 2144.05 IIB states that a particular parameter must first be recognized as a result effective variable, i.e., a variable which achieves a recognizable result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Macke to have a coupler length corresponding to at least one-quarter of a propagation velocity pulse length of the first electromagnetic signal in order for the coupler to function properly.

In regard to claim 27 and 30, Macke discloses wherein the transmitter drives a first electromagnetic signal from a first end of a first conductive element toward a second end the first conductive element being in proximity to a plurality of substances (will have at least a material and air in proximity; fig 4-5 conductive elements 306/410, 304/408; col 1 line 5-10), wherein an induced second electrical signal with propagate along the second conductive element toward a first end of the second conductive element (fig 4; col 4 line 66 – col 5 line 16).

Macke lacks specifically stating that the transmitter drives a first electromagnetic signal without also driving the second conductive element.

Blaine states that the transmitter drives a first electromagnetic signal without also driving the second conductive element (col 9 line 58-60 and col 11 line 32-35; has a separate transmit and receive trace).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Macke to have a transmitter drive a first signal without driving a second signal as disclosed by Blaine in order to have an accurate sensor with increased sensitivity (col 2 line 50-57; col 11 line 45-49).

6. Claims 4, 5, 15-18, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Macke and Blaine, as applied to claim 1 and 20, in view of Lutke et al. (6229476).

Macke lacks specifically a system/method comprising: wherein the dielectric boundary between substances corresponds to a transitional region between a gaseous substance and a liquid substance; wherein the dielectric mismatch boundary corresponds to a transitional region between at least two of a vacuum, a gaseous substance, a liquid substance, a semi-solid substance, and a solid substance; a float for positioning the coupler at the boundary, the float includes a buoyant component and a weighted component; and wherein the tank is above or below ground.

Lutke et al. discloses a system for measuring the level of a liquid

- wherein the boundary corresponds to a transitional region between a gaseous substance and a liquid substance (fig 1 shows a container (3) and liquid level (1), air/gas is located in the empty part of the container); [claims 4 and 5]

- the container could be positioned either above or below ground (fig 2), as some tanks or water supply containers are known to supply water from an underground source in many industries (col 1 line 15-18).

- a float for positioning the coupler at the boundary (col 4 line 16-26) in order to determine the level of liquid, the float includes a buoyant component and a weighted component (col 5 line 7-15) in order for it to stay at the level of the liquid.

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Macke as modified by Blaine to incorporate a gas/liquid boundary, and a float with a buoyant and weighted component as taught by Lutke et al. in order to accurately measure the level of a liquid while being cost effective with low maintenance (abstract).

7. Claims 10 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Macke, as applied to claim 1 and 20, in view of Resnick (5910188).

Macke lacks specifically stating the first and second conductive elements are flexible.

Resnick teaches a first and second conductive material in a liquid level meter being made with flexible materials (col 6 line 5-7).

It would have been obvious to one with ordinary skill in the art at the time the invention was for Macke to use flexible material for the first and second conductive elements as taught by Resnick in order to allow bending to enable the conductors to conform to the tank (col 6 line 6-7).

8. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Macke, as applied to claim 1 and 20, in view of Kielb et al. (6373261).

Macke lacks wherein the processor communicates the substance level to a digital data processing device during a communication session.

Kielb et al. teaches a device to measure characteristics of a material by measuring reflected pulses, which contains output circuitry to transmit information relating to the product height (abstract).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Macke to incorporate communicating the substance level to a digital data processing device as taught by Kielb et al. in order to be able to control the current in the container in response to the height of the liquid (col 2 line 34-36).

Response to Arguments

9. Applicant's arguments with respect to claims 1-5 and 7-31, have been considered but are moot in view of the new ground(s) of rejection as seen above.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

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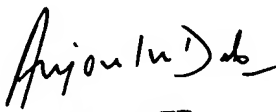
mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff Natalini whose telephone number is 571-272-2266. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lefkowitz can be reached on 571-272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jeff Natalini



ANJAN DEB
PRIMARY EXAMINER